Taxes and fees of regional water authorities in the Netherlands

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Brief summary of the case

The Dutch water management system is fairly unique in the world due to the comprehensive water quantity regulation through dykes and artificial waterways and its linkage with water quality regulation. The existing levy system is based on principles of cost recovery and 'stake-pay-say' (i.e. strong stakeholder participation and more influence for those who pay levies). The peculiarities of the levy base clearly had a strong impact on businesses' behaviour in the past, investing in their own water treatment plants to avoid payment of levies. Moreover, the levy also seems to have contributed to innovation in the waste water treatment sector. Although the Dutch water levy system seems to be working quite well, as identified in a 2014 OECD report there remain opportunities for further improvement and an evaluation of the system is currently underway.

1 Description of the design, scope and effectiveness of the instrument

1.1 Design of the instrument

Water management in a delta like the Netherlands is a complex undertaking, due to its low-lying geographical position, the high density and variety of waterways, the high population density, and the intensive use of land (OECD, 2014a,b). An elaborate financing structure has been established to fund water management in this setting. The benefits of these water management functions accrue to a variety of users. For example, several user groups – such as households, farmers, industry and businesses – benefit from flood risk management, as more than 30% of the country is below sea level (van der Veeren and Keijser, 2011), and 65% of Dutch GDP is earned in areas that need to be protected against flooding by rivers or the sea (Delta Committee, 2011).

The agencies involved in water resources management in the Netherlands finance their budgets in different ways. Guidance is provided by the 'user pays' or the 'polluter pays' principles. An objective of most water-related levies is ensuring full cost recovery. The most important levies and fees related to water use and pollution are delegated to the so-called Regional Water Authorities (RWAs) (see section 1.2). The taxation of water consists of several different instruments and the RWAs are 95% funded through their own levies. In 2009, the RWAs put in place a new tax system that removed separate levies for the maintenance of water barriers, water quantity management, waterways, road management and water quality. Three different levies currently apply[1] (see also OECD, 2014a,b):

(i) A **water systems levy** (Dutch: *watersysteemheffing*) to cover the costs of 'dry feet' (including flood protection measures) and to provide sufficient and clean surface water[2]. This is charged to building and home owners ('built' or 'property owners'

[1] Note that the variation in rates across regions is large. Table 2 below offers an average household bill for all three levies (and the average payment for drinking water).

[2] A levy to cover the cost of dry feet already existed in the Middle Ages.

pay about 49%), households[3] ('residents' or 'households' covers about 39%), and owners of 'not-built' land for agriculture (the category 'not built' or 'owners of cultivated land') and nature conservation (together cover about 11%);

(ii) A **waste water treatment levy** (Dutch: *zuiveringsheffing*) related to the cost of waste water treatment.[4] This depends on the amount of pollution that households or businesses discharge into the sewage system, but households and small firms face a fixed fee ('forfait'). The levy is based on a 'pollution unit' equal to the average amount of waste substances discharged per year per entity. In 2012, the average levy was EUR 53.51 per pollution unit and the ratio of tax revenues of businesses to households was 26% to 74%; and

(iii) A **pollution levy** (Dutch: *verontreinigingsheffing*) for direct discharges to surface waters, originally introduced in 1970. The levy is charged depending on the amount of pollution that households or businesses discharge into surface waters.[5]

In addition to these levies raised by RWAs, the central Government contributes to the RWAs' finances by paying construction and maintenance costs of water barriers and the main waterways. In addition to the waste water treatment levy at the water board level, owners of residential and business properties also pay a sewage levy (Dutch: *rioolheffing*) for their connection to the sewage network at the municipal level. The overall cost of all water use in the Netherlands (including the cost of producing drinking water, sewerage treatment, etc.) is estimated to be about 1.26% of GDP (OECD 2014a,b). The overall cost of RWAs is about EUR 2.6 billion each year, i.e. around one third of this overall cost. Note also that water management and its financial regulation is a highly decentralised system where the central Government only plays a minor role.

The system with three different levies was introduced in 2009. Until 2008, the waste water treatment function and the clean surface water function were financed by the water pollution levy. The cost of water protection and maintenance of waterways were financed by a water quantity levy. Therefore the major change is that cost recovery of waste water treatment is now dealt with separately from a pollution levy on the remaining discharges in the water system.

1.2 Drivers and barriers of the instrument

In 2014 there were 23 Dutch RWAs or 'water boards' (Dutch: waterschappen). The RWAs are responsible for the management and maintenance of water barriers and waterways, maintenance of water level in polders and maintenance of surface water quality through wastewater treatment. They are not responsible for water supply to the general public (OECD 2014a,b). The RWAs have their own governing bodies, tax areas and legal powers, which are

[3] The water system levy for households is on average EUR 69 and varies between EUR 32 and EUR 120 between RWA regions (Coelo 2012).

[4] The waste water treatment levy varies from below EUR 125 to over EUR 255 across the RWA districts (see Coelo 2012).

[5] Five water boards also collect a road levy (Dutch: wegenheffing) that is earmarked for regional road maintenance. There also exists a national pollution levy for direct discharges to waterways that do not fall under the jurisdiction of the water boards (the so-called Rijkswateren).

derived from the 1992 Regional Water Authorities Act which was substantially amended in 2007[6] ('Wet modernisering waterschapsbestel'), the Water Act (2009) and the authorities' own by-laws (Havekes et al., 2015).[7] Note also the leading principle applied in this field of 'stake-pay-say' (i.e. strong stakeholder participation and more influence for those who pay levies).

At the end of the 1960s, environmental awareness grew strongly and environmental policies mainly targeted waste and water pollution. Decentralised environmental levies, fees and charges were introduced to finance local abatement policies according to the 'polluter pays principle'. These policies were implemented by both municipalities and the RWAs. As a consequence these charges and fees were set up so that households and firms alike would contribute.

In the recent past, the Netherlands has seen an increasing variety of local arrangements in the wastewater chain and the adoption of successive plans as country-wide instruments for strategic planning to deal with 'too much – too little – too polluted water'. Other important reforms have included the 'modernisation' in 2006 of the Rijkswaterstaat (the National Water Authority and the executive agency of the Ministry of Infrastructure and the Environment), and the consolidation of the water-related legal framework in 2009, with eight water laws combined into the National Water Act. Further cross-sectoral integration between spatial planning, nature conservation and water policy at the national level is being contemplated in the Environmental Planning Act framework, which is currently under preparation and expected to be adopted by 2018 (OECD 2014a,b).

1.3 Revenue collection and use

In addition to the central Government, three other governmental bodies are permitted to levy taxes in the Netherlands, i.e. the provincial, municipal, and regional water authorities. The provincial authorities impose a number of environmental taxes, but only one levy on groundwater which generates EUR 15 million per year. The sewage levy is applied by municipalities. In 2012, about 91% of the total tax burden originated from national taxes, the remaining taxes can be attributed to the provinces (1%), municipalities (6%) and the RWAs (2%) (UVW, 2015). Table 1 shows the overall revenue collected by the RWAs and the revenue per levy since the new levy system was applied in 2009. Overall revenue has risen in nominal terms from EUR 2,173 million in 2009 to EUR 2,692 million in 2016, i.e. a substantial rise of 24% in seven years. Among other reasons, this increase accounts for RWAs' yearly contribution of EUR 181 million to a national flood protection program ('Hoogwaterbeschermingsprogramma') and RWAs' responsibility for muskrat control measures since 2011.

[6] Its fiscal paragraph was amended in January 2009.

[7] The Water Act is aimed at simplifying the implementation of European water rights (particularly the Water Framework Directive and the Directive on the Assessment and Management of Flood Risks). The Water Act contains almost all the laws relating to water. The institute of the regional water authority is, however regulated in the RWA Act, the (municipal) sewerage management in the Environmental Management Act, and the drinking water supplies in the Drinking Water Act (Havekes et al. 2015).

Table 1 RWAs, overall revenue and revenue for each levy (in EUR million)

	2009	2010	2011	2012	2013	2014	2015	2016*
Total levies	2,173	2,262	2,343	2,426	2,504	2,575	2,643	2,692
Water system levy	999	1,059	1,104	1,158	1,223	1,279	1,344	1,377
Levy road maintenance	35	37	37	38	35	35	36	36
Other	29	22	17	17	16	11		
Waste water treatment levy	1,097	1,134	1,176	1,204	1,221	1,241	1,255	1,270
Pollution levy	12	10	9	10	9	9	9	9

Source: Statistics Netherlands (2016a)
* Estimated figures for 2016.

As noted before, the waste water treatment levy, the water systems levy, and the pollution levy are all earmarked taxes that provide the RWAs with sufficient funds for necessary investments and maintenance. Since direct discharges to surface waters rarely occur these days, the annual revenue from the pollution levy is only about EUR 10 million. The waste water treatment levy and the water systems levy are responsible for an annual revenue of EUR 1.3 and EUR 1.2 billion respectively. In 2012, the administrative costs of raising these taxes fell to EUR 4.50 for every EUR 100 collected (from EUR 6.30 in 2005) (Dekking and Havekes, 2014).[8]

The levies are applied to both consumers and other 'property owners' like firms and farmers. Because the distribution of the water quantity levy from before 2008 was different from the water pollution levy, the new system caused some tax shifts in the distribution between firms and households. For instance, citizens living in areas without flood protection would sometimes not pay for flood protection under the old system, but had to pay the full water systems levy from 2009 onwards. On average, the new tax system resulted in a higher tax burden for households, and lower taxes for firms (agriculture in particular) and owners of conservation areas; a tax shift of approximately EUR 79 million from (agricultural) firms and (conservation) land owners to households (van den Berg et al., 2009).

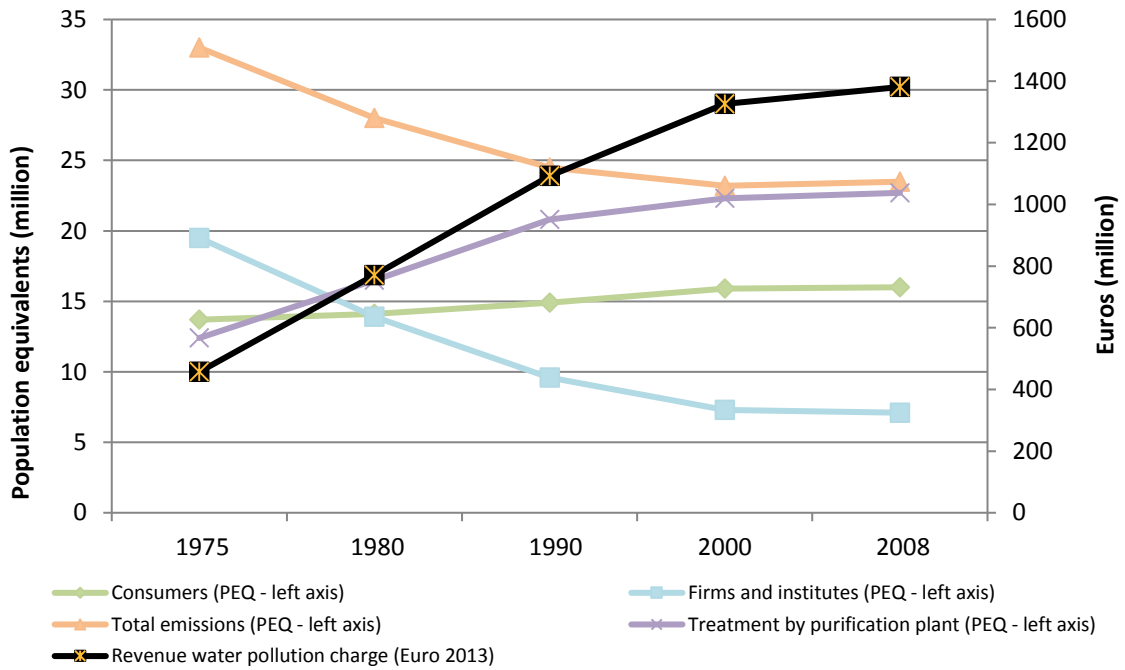
1.4 Environmental impacts and effectiveness

Both Dutch water and waste charges have often been praised for their effectiveness and even the inducement of technological change (e.g. Opschoor and Vos, 1989). Less attention has been paid, however, to the important design elements that have contributed to this success as explained above. The water pollution levy was a typical emission tax from its conception, i.e. its tax base was directly related to a 'weighted' pollution index.[9] This analysis focuses on the impact and effectiveness of the old pollution levy, i.e. the levy that was in force before 2009 and which was also used to finance waste water treatment.

[8] This substantial reduction in cost is due to cooperation between RWAs and municipalities in the collection of levies and local taxes.
[9] The population equivalent (PEQ) in waste water treatment expresses the ratio of the sum of the pollution load produced during 24 hours by industrial facilities and services to the pollution load in household sewage produced by one person in the same time period. For practical calculations, it is assumed that one unit equals 54 grams of biochemical oxygen demand per 24 hours.

Figure 1 shows some key correlations of the Dutch water pollution tax. Interestingly, the initial application and substantial rise of the levy (right axis) seems to have contributed to a sharp decline in overall emissions until about the year 2000 (left axis). One of the main reasons has been the clear shift from emissions directly discharged to open water towards water treatment plants, which has increased from 13 million population equivalents (PEQ) to 22 million PEQ treated by purification plants. This enormous shift is mainly related to changing behavior of firms, who have increasingly invested in their own water treatment plants to avoid paying levies.

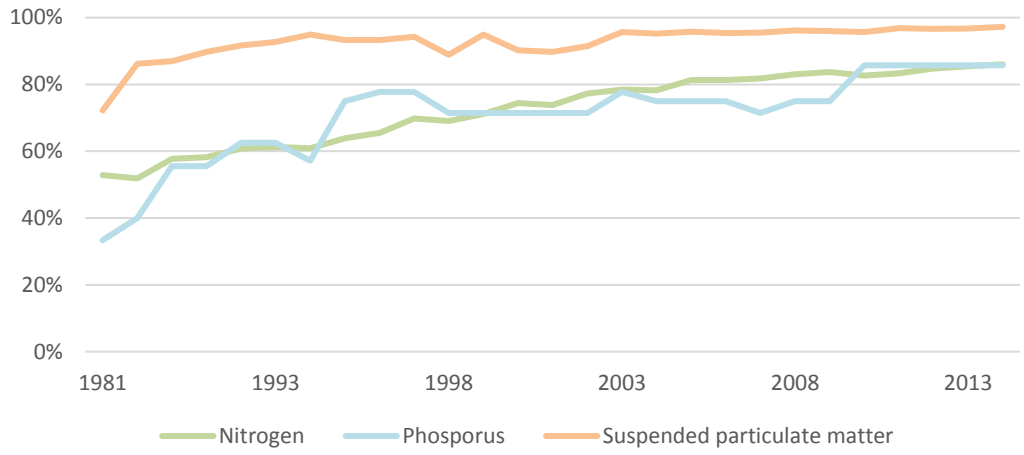
Figure 1 Cost, production and treatment of waste water in the Netherlands 1975-2008



Note: Waste water produced and treated in million population equivalents (left axis); revenue in EUR million at 2013 prices (right axis).
Source: EDC (2011)

A final indicator of the effectiveness of this earmarked tax is provided by Figure 2. This shows the percentage of some of the most important pollutants (nitrogen, phosphorus and suspended particulate matter) removed by waste water treatment in the Netherlands from 1981-2014. For instance, in 1981 untreated sewage had a nitrogen concentration of 53 mg/l and a concentration of 25 mg/l after treatment – a removal rate of 53%. For all three categories, the removal rates have improved significantly – the removal rate of nitrogen was 86% in 2014.

Figure 2 Removal rate for key pollutants in waste water treatment



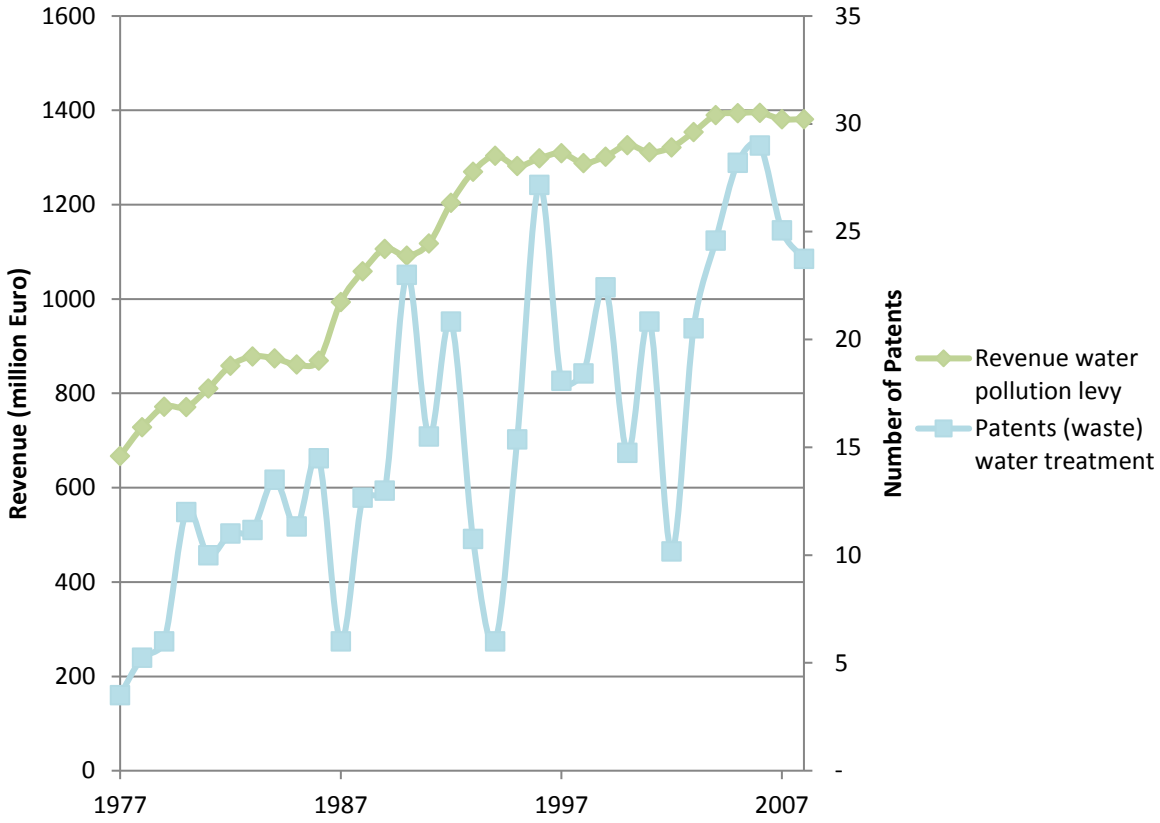
Source: Statistics Netherlands (2016b)

1.5 Other impacts

Employment data over time are difficult to obtain in the Netherlands (due to several changes in measurement in the last 15 years). In total 4,000 people are employed for waste water treatment in 2012 (EDC, 2014). However, this figure does not include employment for other purposes, like dyke maintenance or the RWAs themselves. It is estimated that about 11,000 people are employed by the RWAs.

One measure of a potential innovation impact is the number of patents in water and waste water management. In the Netherlands 273 patents were filed in the period 1977-2010 which is 5.6% of the overall number of patents in this category in the EU. This is a substantial number (the Netherlands ranks 5th behind Germany, France, UK and Italy). Currently the waste water treatment plants are active in new purification technologies, like the well-known Nereda technology, as well as technologies for recovery of energy and materials from waste water sludge.

Figure 3 Revenue water pollution levy and patents in (waste) water management



Source: OECD iLibrary and OECD Regpat database

It is not easy to assess distributional consequences due to the complex way in which the levies are imposed and the enormous variation across regions of the Netherlands. As mentioned above, the wastewater levy varies from below EUR 125 to over EUR 255 across the RWA districts (see Coelo 2012). This variation is also related to differences in regional cost and prevents the need for cross-subsidisation between the regions. The OECD (2014b) calculated the average household water bill in 2012 (see Table 2). Based on these figures, the average water bill for households amounts to EUR 533, or EUR 464, if the costs of water management are not factored in. This suggests that the water bill in the Netherlands is similar to countries that recover costs from revenues through water bills (e.g. Belgium-Wallonia and Flanders, England and Wales, France, Sweden, Switzerland).

Table 2 Average household water bill in 2012

Payment for	Payment to	Average amount	Source
Drinking water	Drinking water companies	EUR 126	(Vewin, 2012)
Sewage – Sewage levy	Municipalities	EUR 177	(Coelo, 2012)
Wastewater – Wastewater levy	Regional water authorities	EUR 161	(Coelo, 2012)
Water management – Water system levy[1]	Regional water authorities	EUR 69	(Coelo, 2012)
Total		EUR 533	

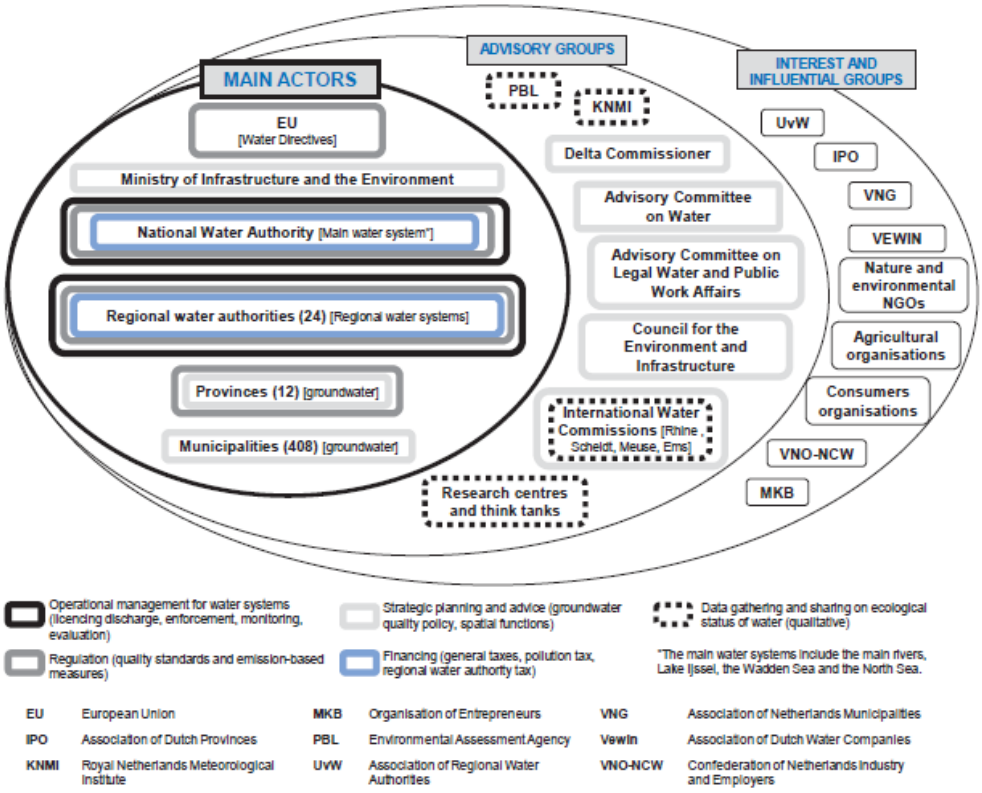
Note: 1. This includes a water pollution levy and is the approximate average for the category "residents" or "households".

Source: OECD (2014b)

2 Stakeholder engagement

The OECD has shown how many levels of government and stakeholders are involved in water management in the Netherlands (see Figure 4). This is hardly surprising because water is a key resource. Several important principles guide the financing of water resources management in the Netherlands, i.e. the 'user pays' and 'polluter pays' principles, and 'stake, pay, say'. These principles also guide who is involved in which aspect of the overall planning process, i.e. in the definition of goals and implementation through instruments.

Figure 4 Institutional mapping



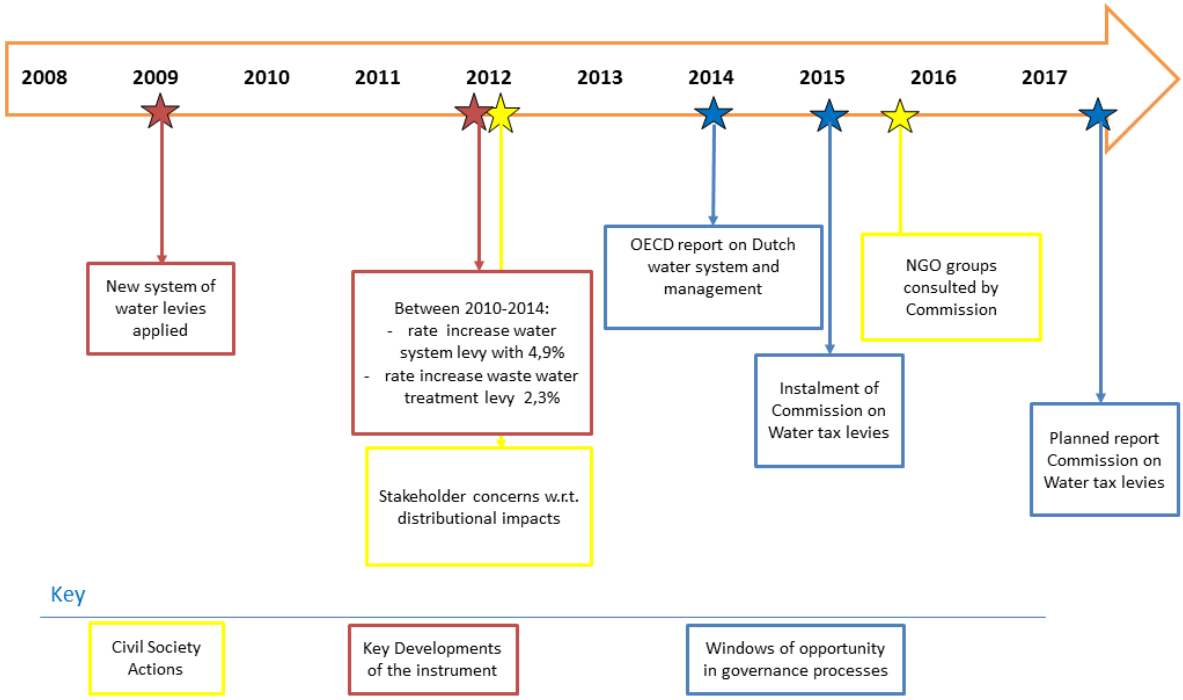
Source: OECD (2014b)

Unsurprisingly, there is often disagreement on who should contribute how much to what in relation to cost recovery through the levies. Key players are households, 'property owners', agriculture and different government levels (municipalities, RWAs, provinces and central government including the National Water Authority (*Rijkswaterstaat,* which is the agency responsible for water management). Other stakeholders are drinking water companies, the Delta Commissioner and many advisory institutes. The presence of NGOs is rather limited in the country's national water policy but more orientated towards specific projects, and very active towards international cooperation and developing countries.

As noted before the Dutch water levy system was fundamentally reformed in 2009 (see Figure 5). Interestingly, a 2014 OECD (2014b) report opened a new window of opportunity for reform and has led to a process to evaluate the current levy system. One of the issues is the major

shift in the distribution of cost towards households. Another issue is that there is currently, aside from the existing manure policy, no specific policy to address diffuse sources of the agricultural sector as a 'polluter' of water, and hence as a 'payer' for losses in terms of decreased biodiversity, recreational values, scenic beauty and other water quality-related values. This observation, however, is also highly disputed by some stakeholders.

Figure 5 Timeline of Key Developments in Dutch water levies



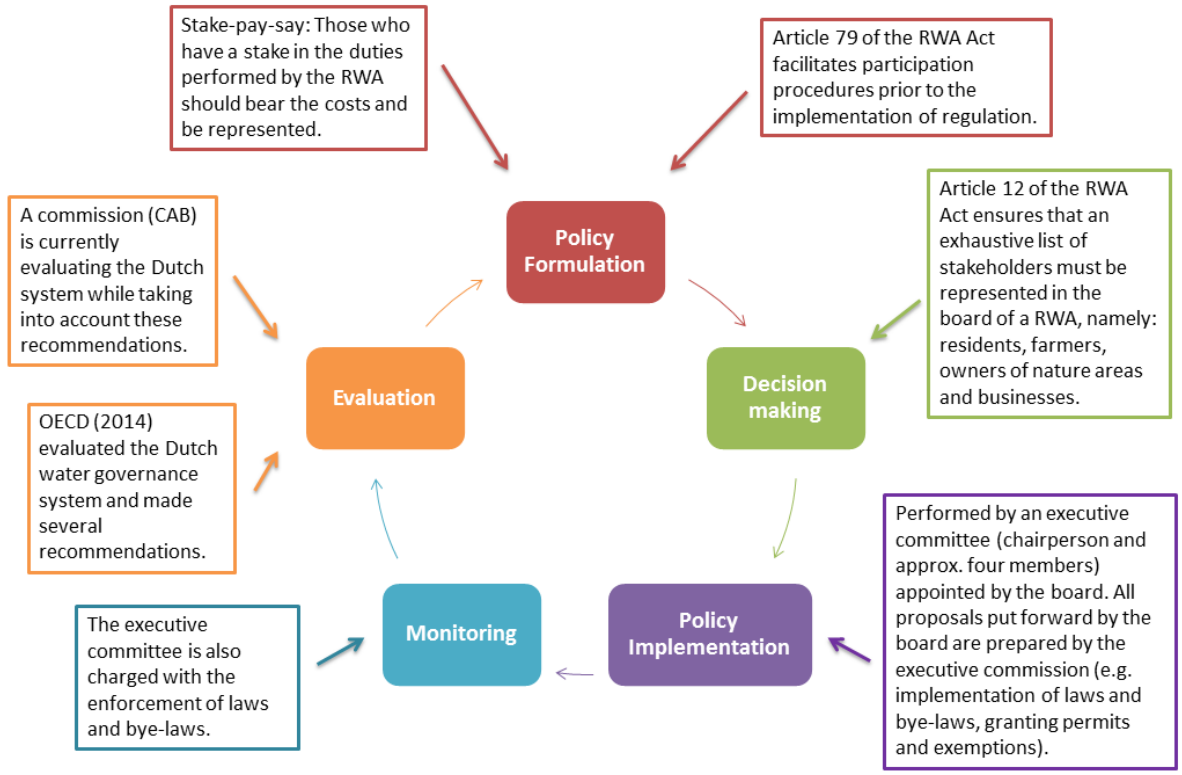
This new window of opportunity has been exploited by the Ministry of Infrastructure and the Environment and led to the installation of a new tax commission (in Dutch *Commissie Aanpassing Belastingstelsel*, CAB). Representation within this Commission is mainly restricted to managers from within the water sector. However, the Commission has created several opportunities to involve many internal and external stakeholders in its evaluation process, including firm representatives, farmers and NGOs. This process will be linked to a broader evaluation of long term financing issues of sustainable water use in the Netherlands.

3 Windows of opportunity

Figure 6 summarises the role of civil society in the processes of policy formulation, decision making, policy implementation, monitoring and the evaluation of the Dutch water levies. In all of these processes there are windows of opportunity for stakeholders to be involved. Policy formulation is based on the 'stake-pay-say' principle: those who have a stake in the duties performed by the RWA should in principle bear the costs and be represented in the governing bodies of the RWAs. Furthermore, binding decisions and regulation that affects the citizens of a RWA's region generally do not come about without participation procedures (as is stipulated in Article 79 of the RWA Act). Furthermore, Article 12 of the RWA Act ensures that an exhaustive list of stakeholders must be represented in the board of a RWA. Hence, residents, farmers, owners of nature areas and businesses are all represented in decision

making. Policy implementation is performed by an executive committee consisting of a chairperson and approx. four members that are appointed by the board. All proposals, such as the implementation of laws and bye-laws, and the granting of permits and exemptions that are put forward by the board, are prepared by the executive committee. Note that the executive committee is also charged with the enforcement of laws and bye-laws (Havekes et al. 2015). The OECD (2014b) report evaluated the Dutch water governance system and made several recommendations. As noted above, a new tax commission (CAB) is currently evaluating the Dutch system in response to the OECD evaluation and will present its final report in 2017.

Figure 6 Civil society engagement in Dutch water tax levies



4 Insights into future potential/reform

4.1 Actual Planned reforms and stakeholder engagement

See Section 2.

4.2 Suggestions for future reforms – instrument design and civil society engagement

The Dutch water levy system based on its cost recovery principle seems to be working quite well. This is echoed in the conclusion of the OECD (2014b) report. This report, however, also concludes that 'an agenda for water policy reform in the Netherlands should explore cost-efficient, adaptive and place-based responses, which minimise path dependency and improve economic incentives to manage "too much", "too little" or "too polluted" water'. The suggestion for a renewed focus on governance, with an emphasis on active stakeholder

involvement, as well as more transparent information and performance monitoring, seems to be applied already in the current levy reform process (see discussion on CAB in Section 2).

However, the OECD (2014b) also concluded that the 'economic incentives to efficiently manage "too much", "too little" and "too polluted" water could be strengthened'. Those who benefit from spatial development, such as municipalities and property developers, do not necessarily bear the additional costs those developments impose on water management, for instance. With regards to water pollution, the OECD (2014b) concludes that the current levy system is insufficiently linked to the economic incentives to exploit the numerous technical measures in place to reduce sources of pollution. Also the strong distributional impacts of the reform in 2009 still deserve attention in view of the projected rise in the future cost of maintaining both water quantity and quality objectives.

4.3 Suggestions for replicability

Some aspects of the Dutch situation are fairly unique, such as the comprehensive water quantity regulation through dykes and artificial waterways. However, the design of the cost recovery levy provides fairly good prospects for replicability. Apparently, the specifics of the levy base has clearly had a strong impact on businesses' behaviour in the Netherlands. Moreover, the levy also seems to have contributed positively to innovation in the drinking water sector. The 'stake-pay-say' principle and approach to strong stakeholder engagement at the regional level could also be of interest to other countries.

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